

IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A high frequency receiver provided in a same housing as a housing including a transmitter having a transmission signal generation part, having a frequency band of a receive signal in a vicinity of a frequency of a carrier wave of a transmission signal generated by the transmission signal generation part, and to which a high frequency signal including the receive signal and a transmission signal released from a transmitting antenna of the transmitter is inputted via an antenna,

the high frequency receiver comprising:

an antenna input terminal to which the high frequency signal is inputted;

a mixer having a first input terminal to which the high frequency signal inputted to the antenna input terminal is inputted and a second input terminal to which an output signal from a local oscillator is inputted; and

an output terminal to which an output signal from the mixer is inputted,

wherein the high frequency receiver comprises

a distributed transmission signal input terminal to which at least a part of a distributed transmission signal obtained by distributing the transmission signal is inputted in the housing;

a phase shifter to which the distributed transmission signal inputted to the distributed transmission signal input terminal is inputted;

a detector for detecting a level of the transmission signal included in the distributed receive signal obtained by distributing the high frequency signal; and

a level regulator having a first regulator input terminal to which an output from the detector is coupled and a second regulator input terminal to which the distributed transmission signal is inputted, and

the level regulator changes a level of the distributed transmission signal in accordance with an output signal from the detector, and a signal input via the level regulator and the phase shifter and the high frequency signal are synthesized to be inputted to the mixer.

2. (Currently Amended) The high frequency receiver of claim 1,

wherein the high frequency receiver has a transmission level signal input terminal to which a transmission level wave-detection signal obtained by detecting an output level of a power amplifier of the transmitter is inputted, and the transmission level wave detection signal and an output signal from the detector are inputted to the level regulator in which the level of the distributed transmission signal is changed in accordance with these signals.

3. (Currently Amended) The high frequency receiver of claim 1, comprising:

a phase changer provided in the phase shifter and changing a phase of the distributed transmission signal in accordance with a control signal to be inputted;

a phase controller for generating a control signal to control a phase change amount of the phase changer; and

a memory coupled to the phase controller,

wherein the memory includes a table storing the control signal to be inputted to the phase changer in accordance with a channel to be received, and the phase controller generates

a control signal in accordance with the receiving channel based on the table and inputs it to the phase changer.

4. (Currently Amended) The high frequency receiver of claim 3,
wherein the phase changer includes a variable-capacitance diode, and the control signal is a voltage to be inputted for changing the capacitance of the variable-capacitance diode.

5. (Currently Amended) The high frequency receiver of claim 1,
wherein the phase shifter includes:
a phase changer for changing a phase of the distributed transmission signal in accordance with the control signal to be inputted; and
a phase control terminal to which a control signal from the phase controller coupled to the phase changer is coupled,
to the phase control terminal, a control signal for controlling a phase change amount of the phase changer into a phase change amount corresponding to each receiving channel is inputted, and the phase changer changes a phase of the distributed transmission signal based on the control signal.

6. (Currently Amended) The high frequency receiver of claim 1,
wherein the phase shifter include:
a phase changer for changing a phase of the distributed transmission signal in accordance with the control signal to be inputted;

a phase control terminal to which a control signal from a phase controller coupled in order to control a phase change amount of the phase changer;

a phase comparator having a first comparator input terminal to which the distributed transmission signal is inputted and a second comparator input terminal to which the distributed receive signal is inputted; and

a low-pass filter to which an output terminal of the phase comparator is coupled, and the phase comparator detects a phase difference between the distributed transmission signal and the distributed receive signal, and the phase changer changes the phase change amount in accordance with the phase difference.

7. (Original) The high frequency receiver of claim 1, wherein the distributed transmission signal is a signal obtained by distributing the transmission signal before it undergoes amplification in a power amplifier of the transmitter.

8. (Original) The high frequency receiver of claim 7, comprising a first band-pass filter coupled between the distributed transmission signal input terminal and the level regulator, wherein the first band-pass filter allows a frequency of a transmission signal noise among transmission signals to pass and attenuates a frequency of a carrier wave.

9. (Currently Amended) The high frequency receiver of claim 8, comprising a synthesizer coupled between the antenna input terminal and the mixer, and having a first synthesizer input terminal to which a high frequency signal is inputted and a second

synthesizer input terminal to which a signal is ~~inputted~~ via the level regulator and the phase shifter.

10. (Currently Amended) The high frequency receiver of claim 9,
wherein a second band-pass filter is provided between the antenna input terminal and the first synthesizer input terminal of the synthesizer, a high-frequency amplifier is coupled between an output from the synthesizer and an input to the mixer, and the second band-pass filter allows a signal having a receive frequency to pass and attenuates the transmission signal.

11. (Original) The high frequency receiver of claim 10,
wherein both the first band-pass filter and the second band-pass filter allow the frequency of the transmission signal noise to pass and attenuate a frequency of the transmission signal.

12. (Original) The high frequency receiver of claim 11,
wherein the first band-pass filter and the second band-pass filter have same attenuation properties.

13. (Currently Amended) The high frequency receiver of claim 10, comprising
a third band-pass filter provided in parallel to the second band-pass filter; and
a switch coupled to the third band-pass filter and the second band-pass filter, and
allowing any one of the second and third band-pass filters to selectively be coupled between the antenna input terminal and the mixer,

wherein a narrow band filter is used for the second band-pass filter and a passband of the third band-pass filter is set to be lower than a passband of the second band-pass filter.

14. (Original) The high frequency receiver of claim 1,
wherein the distributed transmission signal is a signal obtained by distributing a signal amplified by a power amplifier of the transmitter.

15. (Currently Amended) The high frequency receiver of claim 14, comprising
a synthesizer coupled between the antenna input terminal and the mixer and having a first synthesizer input terminal to which a high frequency signal is inputted and a second synthesizer input terminal to which a signal is inputted via the level regulator and the phase shifter.

16. (Original) The high frequency receiver of claim 9, comprising
a fourth band-pass filter provided between an output from the synthesizer and the mixer and to which an output from the synthesizer is coupled; and
a high-frequency amplifier coupled between the fourth band-pass filter and the mixer,
wherein the fourth band-pass filter allows a receive frequency signal to pass and attenuates a transmission signal.

17. (Currently Amended) The high frequency receiver of claim 16, comprising
a fifth band-pass filter provided in parallel to at least the fourth band-pass filter; and

a switch coupled to the fifth band-pass filter and the fourth band-pass filter and allowing any one of the output signals from the fourth and fifth band-pass filters to selectively be inputted to the mixer,

wherein a narrow band filter is used for the fourth band-pass filter and a passband of the fifth band-pass filter is set to be lower than a passband of the fourth band-pass filter.

18. (Currently Amended) A transmitter provided in a same housing as a housing including the high frequency receiver of claim 1 and transmitting a signal having a frequency in a vicinity of a frequency of a receive signal of the high frequency receiver from a transmitting antenna,

the transmitter comprising:

an input terminal;

a transmission signal generation part to which a digital signal inputted to the input terminal is inputted and which generates a transmission signal; and

a transmission signal output terminal to which an output from the transmission signal generation part is inputted and which inputs the transmission signal to the transmitting antenna;

wherein between an output from the transmission signal generation part and the transmission signal output terminal, a first distributor having an input coupled to an output from the transmitted signal generation part and one output signals coupled so as to be inputted to the transmission signal output terminal, and a distributed transmission signal output terminal coupled to another output from the first distributor are provided.

19. (Original) The transmitter of claim 18,
wherein the transmission signal generation part includes a local oscillator for generating an oscillation noise at least in a frequency band of a receive signal, and a power amplifier is coupled between the first distributor and the transmission signal output terminal.

20. (Original) The transmitter of claim 18,
wherein between the distributed transmission signal output terminal and the another output from the first distributor, a first band-pass filter is coupled, and the first band-pass filter allows a frequency of an oscillation noise of a local oscillator to pass and attenuates a signal having a frequency of a carrier wave.

21. (Currently Amended) The transmitter of claim 18,
wherein the transmission signal generation part comprises an oscillator, and a power amplifier to which an output from the oscillator is coupled, the power amplifier using a power amplifier that generates a noise in a frequency band of a receive signal, and a transmission signal output from the power amplifier is distributed by the first distributor and [[output]] outputted.

22. (Original) The transmitter of claim 21, comprising
a second distributor to which the another output from the first distributor is coupled and which has a first output terminal coupled to the transmission signal output terminal; and
a coupling transmission level detector coupled between a second output terminal of the second distributor and an electric control terminal of the power amplifier.

23. (Currently Amended) A transmitter provided in a same housing as a housing including the high frequency receiver of claim 5 or 14 and transmitting a signal having a frequency in a vicinity of a receiving frequency of the high frequency receiver from a transmitting antenna,

the transmitter comprising:

an input terminal;

a transmission signal generation part to which a digital signal inputted to the input terminal is inputted and which generates a transmission signal, and

a transmission signal output terminal to which an output from the transmission signal generation part is inputted and which inputs the transmission signal to the transmitting antenna,

wherein the transmitter includes:

a power amplifier to which an output from the transmission signal generation part is coupled and which generates a noise into a frequency in a frequency band of a receive signal;

a first distributor to which an output from the power amplifier is inputted and which has a first distributor output terminal coupled to the transmission signal output terminal; and

a distributed transmission signal output terminal coupled to a second distributor output terminal of the first distributor, and

the first distributor distributes a transmission signal amplified by the power amplifier.

24. (Currently Amended) Portable equipment comprising ~~[[the]]~~ a transmitter and a high frequency receiver for receiving a high frequency signal having a frequency in a vicinity of a carrier wave of a transmission signal of the transmitter in a same housing,

the portable equipment comprising:

an antenna;

a high frequency receiver to which the high frequency signal ~~[[input]]~~ inputted to the antenna is ~~[[input]]~~ inputted;

a demodulator circuit to which an output from the high frequency receiver is coupled;

a decoder circuit to which an output from the demodulator circuit is coupled;

a voice output device and a display device to which an output from the decoder circuit is coupled;

a voice ~~[[output]]~~ input device;

an encoder circuit coupled between an output from the voice input device and an input of the transmitter; and

a transmitting antenna to which an output from the transmitter is ~~[[input]]~~ inputted,

wherein the high frequency receiver ~~[[uses]]~~ comprises the high frequency receiver of claim 1, the transmitter ~~[[uses]]~~ comprises the transmitter of claim 18, and the distributed transmission signal output terminal and the distributed transmission signal input terminal are coupled to each other in the housing.

25. (Currently Amended) Portable equipment comprising ~~[[the]]~~ a transmitter and a high frequency receiver for receiving a high frequency signal having a frequency in a vicinity of a carrier wave of a transmission signal of the transmitter in a same housing,

the portable equipment comprising:

an antenna;

a high frequency receiver to which the high frequency signal ~~[[input]]~~ inputted to the antenna is ~~[[input]]~~ inputted;

a demodulator circuit to which an output from the high frequency receiver is coupled;

a decoder circuit to which an output from the demodulator circuit is coupled;

a voice output device and a display device to which an output terminal of the decoder circuit is coupled;

a voice ~~[[output]]~~ input device;

an encoder circuit coupled between an output terminal of the voice input device and an input terminal of the transmitter; and

a transmitting antenna to which an output signal from the transmitter is ~~[[input]]~~ inputted,

wherein the high frequency receiver ~~[[uses]]~~ comprises the high frequency receiver of claim 5, the transmitter ~~[[uses]]~~ comprises the transmitter of claim 23, and the distributed transmission signal output terminal and the distributed transmission signal input terminal are coupled to each other in the housing.

26. (Currently Amended) Portable equipment comprising ~~[[the]]~~ a transmitter and a high frequency receiver for receiving a high frequency signal having a frequency in a vicinity of a carrier wave of a transmission signal of the transmitter in a same housing,

the portable equipment comprising:

an antenna;

a high frequency receiver to which the high frequency signal [[input]] inputted to the antenna is [[input]] inputted;

a demodulator circuit to which an output from the high frequency receiver is coupled;

a decoder circuit to which an output from the demodulator circuit is coupled;

a voice output device and a display device to which an output from the decoder circuit is coupled;

a voice [[output]] input device;

an encoder circuit coupled between an output from the voice input device and an input of the transmitter; and

a transmitting antenna to which an output from the transmitter is [[input]] inputted,

wherein the high frequency receiver [[uses]] comprises the high frequency receiver of claim 14, the transmitter [[uses]] comprises the transmitter of claim 23, and the distributed transmission signal output terminal and the distributed transmission signal input terminal are coupled to each other in the housing.

27. (Currently Amended) A method of manufacturing the high frequency receiver of claim 3, the method comprising:

inputting a pseudo distributed transmission signal of a first signal level to a distributed transmission signal input terminal and inputting a pseudo transmission signal having a signal level that is different from the first signal level by a predetermined value and in which a phase is delayed by a value predetermined by the pseudo distributed transmission signal and a receive signal to be received by a high frequency receiver; and then

receiving a receiving channel predetermined by the high frequency receiver;

the method further comprising, after the receiving, changing a control signal to be inputted to a phase changing part in a state in which the high frequency receiver receives the receiving channel and allowing a memory to store a signal that is outputted when a quality of a signal output from the output terminal is most excellent.

28. (Currently Amended) A method of manufacturing portable equipment in which the transmitter of claim 18 and the high frequency receiver of claim 3 are provided in a same housing, the method comprising:

releasing a transmission signal generated by the transmitter from a transmitting antenna, inputting a high frequency signal including the transmission signal to an input terminal, and distributing a transmission signal in the housing and inputting it to a distributed transmission signal input terminal; and then

receiving a receiving channel predetermined by the high frequency receiver;

the method further comprising, after the receiving:

changing a voltage to be inputted to a phase changing part in a state in which the receiving channel is received and allowing a memory to store a voltage that is outputted when a quality of a signal output from the output terminal is most excellent.

29. (Currently Amended) An integrated circuit, comprising:

an antenna input terminal to which a high frequency signal is inputted;

a mixer having a first input terminal to which the high frequency signal inputted to the antenna input terminal is coupled and a second input terminal to which an output signal from a local oscillator is inputted;

an output terminal to which an output signal from the mixer is inputted; and

a PLL circuit loop-coupled to the local oscillator,

wherein the integrated circuit for the high frequency receiver comprises:

a distributed transmission signal input terminal,

a phase shifter to which a distributed transmission signal inputted to the distributed transmission signal is inputted,

a detector for detecting a level of the transmission signal included in a distributed receive signal obtained by distributing the high frequency signal, and

a level regulator having a first regulator input terminal to which an output terminal of the detector is coupled and a second regulator input terminal to which the distributed transmission signal is inputted, and the level regulator changes the level of the distributed transmission signal in accordance with the output from the detector and outputs a signal to be inputted via the level regulator and the phase shifter.

30. (Currently Amended) The integrated circuit of claim 29,

wherein the phase shifter comprises a phase changer for changing the phase of a distributed transmission signal in accordance with a control signal to be inputted, and the control signal is inputted via the PLL circuit.